

WHAT IS CLAIMED IS:

1. A method of processing an iris image data, comprising:
  - providing data representing an image of an iris of an eye;
  - performing a Daubechies wavelet transform on the iris image data, thereby dividing the iris image data into multiple data segments;
  - repeating the Daubechies wavelet transform a predetermined number of times on one of the data segments divided in the immediately previous transform, thereby dividing the data segment on which the transform is performed into smaller data segments, wherein the data segment on which the transform is performed represents more information on iris patterns than the other data segments divided in the immediately previous transform; and
  - forming a characteristic vector of the iris image comprising information of at least one data segment divided in each Daubechies wavelet transform.
2. The method of Claim 1, wherein the data segment representing more information on iris pattern than the other segments divided in the immediately previous transform comprise more low frequency components than the other segments.
3. The method of Claim 1, wherein each of the data segments produced in each Daubechies wavelet transform is classified based on frequency components of the data.
4. The method of Claim 1, wherein each of the data segments produced in each Daubechies wavelet transform is classified based on frequency components of the data in two perpendicular directions on an image each data represents.
5. The method of Claim 1, wherein each of the data segments produced in each Daubechies wavelet transform is classified one of HH, HL, LH and LL, wherein HH represents high frequency components in a first direction and a second direction on an image each data represents, the first and second directions being perpendicular to each other, wherein HL represents a high frequency component in the first direction and a low frequency component in the second direction, wherein LH represents a low frequency component in the first direction and a high frequency component in the second direction, and wherein LL represents low frequency components in the first and second directions.

6. The method of Claim 5, wherein the characteristic vector comprises information of a data segment characterized as HH divided in each of the Daubechies wavelet transform.
7. The method of Claim 6, wherein the information of the HH data segment  
5 comprises an average value of data of the segment representing the image thereof.
8. The method of Claim 5, wherein the characteristic vector comprises information of a data segment characterized as LL divided in the last Daubechies wavelet transform.
9. The method of Claim 8, wherein the information of the LL data segment  
10 comprises a substantial portion of the data of the segment representing the image thereof.
10. The method of Claim 8, wherein the information of the LL data segment comprises all of the data of the segment representing the image thereof.
11. The method of Claim 5, wherein a total number of the Daubechies wavelet transform is N, the characteristic vector comprises an N-1 number of values of HH data  
15 segments.
12. The method of Claim 1, further comprising quantizing values of the characteristic vector.
13. The method of Claim 1, wherein the predetermined number of repetitions is set such that a total number of the Daubechies wavelet transform is from 2 to 7.
- 20 14. The method of Claim 1, wherein the predetermined number of repetitions is set such that a total number of the Daubechies wavelet transform is from 4.
15. The method of Claim 1, further comprising registering the characteristic vector with or without further processing.
16. A device for use in processing iris image data, comprising:  
25 means for providing data representing an image of an iris of an eye;  
means for performing a Daubechies wavelet transform on the iris image data, thereby dividing the iris image data into multiple data segments, wherein the means for performing the transform is configured to repeat the Daubechies wavelet transform a predetermined number of times on one of the data segments divided in the  
30 immediately previous transform, thereby dividing the data segment on which the

transform is performed into smaller data segments, and wherein the data segment on which the transform is performed represents more information on iris patterns than the other data segments divided in the immediately previous transform; and

5 means for forming a characteristic vector of the iris image comprising information of at least one data segment divided in each Daubechies wavelet transform.

17. The method of Claim 1, further comprising processing the characteristic vector to determine whether the iris image matches a pre-registered iris image.

18. The method of Claim 17, wherein the characteristic vector is processed  
10 together with a characteristic vector of the pre-registered iris image to produce an inner product of the characteristic vectors.

19. The method of Claim 17, wherein the iris image is determined to match the pre-registered iris image when an inner product of the characteristic vector and a characteristic vector of the pre-registered iris image is greater than a predetermined threshold  
15 value.

20. A device for processing iris image data, comprising  
an input device configured to receive data representing an image of an iris of an eye;  
a first circuit configured to perform a Daubechies wavelet transform on the iris  
20 image data a predetermined number of times; and  
a second circuit configured to form a characteristic vector of the iris image based on the Daubechies wavelet transform.

21. A device for identifying an iris pattern, comprising:  
means for obtaining a characteristic vector from an iris image in accordance  
25 with the method of processing an iris image data of Claim 1; and  
means for processing the characteristic vector to determine whether the iris image matches a pre-registered iris image.

22. A security system comprising:  
the iris image data processing device of Claim 20; and

a third circuit configured to process the characteristic vector to determine whether the iris image matches a pre-registered iris image.